

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A pressure swing adsorption process comprising the ~~step~~  
steps of:

providing a ~~first~~ an equalization conduit that connects each vessel of a plurality of  
vessels;

providing a first valve ~~of the no more than five valves per vessel~~ that fluidly connects  
the ~~first~~ equalization conduit to a first vessel of the plurality of vessels and does not prevent  
flow along the ~~first~~ equalization conduit to any remaining vessels of the plurality of vessels;

providing a second valve that fluidly connects the equalization conduit to the first  
vessel of the plurality of vessels and does not prevent flow along the equalization conduit to  
any remaining vessels of the plurality of vessels; and

separating a gas mixture by absorbing at least one gas component in adsorbent beds  
provided within the plurality of vessels,

wherein the separating step has at least a two-stage pressure equalization, and

wherein the separating step is performed with no more than five valves per vessel of  
the plurality of vessels.

2-4. (Canceled)

5. (Currently Amended) ~~The~~ A pressure swing adsorption process according to  
Claim 1 comprising the steps of:

providing an equalization conduit that connects each vessel of a plurality of vessels;

providing a first valve that fluidly connects the equalization conduit to a first vessel of

the plurality of vessels and does not prevent flow along the equalization conduit to any remaining vessels of the plurality of vessels; and

separating a gas mixture by absorbing at least one gas component in adsorbent beds provided within the plurality of vessels,

wherein the separating step has at least a three-stage pressure equalization, and

wherein the separating step is performed with no more than five valves per vessel of the plurality of vessels, wherein the at least two-stage pressure equalization is further defined as at least a three-stage pressure equalization.

6. (Currently Amended) The process according to Claim 4 ~~5~~, wherein the plurality of vessels includes six vessels, ~~and wherein the at least two-stage pressure equalization is further defined as a three-stage pressure equalization.~~

7. (Original) The process according to Claim 5, wherein the separating step is performed with no more than four valves per vessel of the plurality of vessels.

8-9. (Canceled)

10. (Currently Amended) The process according to Claim 1, wherein the at least two-stage pressure equalization occurs via the first equalization conduit.

11. (Canceled)

12. (Currently Amended) ~~The~~ A pressure swing adsorption process according to Claim 1, comprising the steps of:

providing a first equalization conduit that connects each vessel of a plurality of vessels;

providing a second equalization conduit that connects each vessel of the plurality of

vessels;

providing a first valve that fluidly connects the first equalization conduit to a first vessel of the plurality of vessels and does not prevent flow along the first equalization conduit to any remaining vessels of the plurality of vessels; and

separating a gas mixture by absorbing at least one gas component in adsorbent beds provided within the plurality of vessels,

wherein the separating step has at least a two-stage pressure equalization,

wherein the separating step is performed with no more than five valves per vessel of the plurality of vessels, and

~~further comprising the step of providing a second equalization conduit that connects each vessel of the plurality of vessels, wherein the at least two-stage pressure equalization occurs via the first equalization conduit and the second equalization conduit.~~

13. (Previously Presented) The process according to Claim 12, further comprising the step of providing a second valve of the no more than five valves per vessel that fluidly connects the second equalization conduit to the first vessel of the plurality of vessels and does not prevent flow along the second equalization conduit to any remaining vessels of the plurality of vessels.

14. (Original) The process according to Claim 13, wherein the first valve provides a first predetermined flow rate when in an open state, and wherein the second valve provides a second predetermined flow rate when in an open state.

15. (Original) The process according to Claim 14, wherein the first predetermined flow rate is different from the second predetermined flow rate, and wherein the first valve is

in the open state during a first stage of the two-stage pressure equalization and the second valve is in the open state during a second stage of the two-stage pressure equalization.

16. (Currently Amended) ~~The~~ A pressure swing adsorption process according to Claim 1 comprising the steps of:

providing an equalization conduit that connects each vessel of a plurality of vessels;  
providing a first valve that fluidly connects the equalization conduit to a first vessel of  
the plurality of vessels and does not prevent flow along the equalization conduit to any  
remaining vessels of the plurality of vessels; and  
separating a gas mixture by absorbing at least one gas component in adsorbent beds  
provided within the plurality of vessels,

wherein the separating step has at least a two-stage pressure equalization,  
wherein the separating step is performed with no more than five valves per vessel of  
the plurality of vessels, and

wherein the plurality of vessels each have:

a first opening connected to a source inlet manifold via a second valve of the no more than five valves per vessel and connected to a waste outlet manifold via a third valve of the no more than five valves per vessel; and

a second opening connected to a product outlet manifold via a fourth valve of the no more than five valves per vessel and connected to the equalization conduit via the first valve of the no more than five valves per vessel and a fifth valve of the no more than five valves per vessel, ~~the equalization conduit connecting each vessel of the plurality of vessels.~~

17. (Previously Presented) The process according to Claim 16, wherein the first

valve and the fifth valve do not prevent flow along the equalization conduit to any other vessel of the plurality of vessels.

18. (Previously Presented) The process according to Claim 16, wherein the first valve provides a first predetermined flow rate when in an open state, and wherein the fifth valve provides a second predetermined flow rate when in an open state.

19. (Previously Presented) The process according to Claim 18, wherein the first predetermined flow rate is different from the second predetermined flow rate, and wherein the first valve is in the open state during a first stage of the two-stage pressure equalization and the fifth valve is in the open state during a second stage of the two-stage pressure equalization.

20-50. (Canceled)

51. (Previously Presented) A pressure swing adsorption process comprising the steps of:

separating a gas mixture by absorbing at least one gas component in adsorbent beds provided within a plurality of vessels,

wherein the separating step is initially performed using a pressure swing adsorption cycle for  $n$  vessels, where  $n$  is equal to a number of vessels of said plurality of vessels initially operating to perform the separating step, and

wherein, upon failure of at least one of a specific vessel and a valve directly associated with the specific vessel, the separating step is performed using a pressure swing adsorption cycle for  $n-1$  vessels by bypassing the specific vessel using equalization conduits that are selectively fluidly connected to each vessel of the plurality of vessels by a respective

valve.

52. (Original) The pressure swing adsorption process according to Claim 51, wherein the separating step has at least a two-stage pressure equalization and is performed with no more than five valves per vessel.

53. (Previously Presented) A pressure swing adsorption process for separating a gas mixture by absorbing at least one gas component in adsorbent beds provided within a plurality of vessels, wherein the plurality of vessels are cyclically operated, the process comprising:

an adsorption step;

a first pressure equalization step having at least two stages, the first pressure equalization step decreasing pressure;

a purge step; and

a second pressure equalization step having at least two stages, the second pressure equalization step increasing pressure,

wherein the process is initially performed using a pressure swing adsorption cycle for  $n$  vessels, where  $n$  is equal to a number of vessels of said plurality of vessels initially operating to perform the process, and

wherein, upon failure of at least one of a specific vessel and a valve directly associated with the specific vessel, the process is performed using a pressure swing adsorption cycle for  $n-1$  vessels by bypassing the specific vessel using equalization conduits that are selectively fluidly connected to each vessel of the plurality of vessels by a respective valve.

Application Serial No.: 10/720,517  
Reply to Office Action dated March 9, 2004

54. (Original) The pressure swing adsorption process according to Claim 53, wherein said process is performed with no more than five valves per vessel.

55. (Previously Presented) The pressure swing adsorption process according to Claim 51, wherein the respective valve does not prevent flow along a corresponding equalization conduit.

56. (Previously Presented) The pressure swing adsorption process according to Claim 53, wherein the respective valve does not prevent flow along a corresponding equalization conduit.